KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VP-436N

Presentation Switcher/Scaler

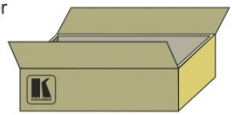
P/N: 2900-300149 Rev 1

VP-436N Quick Start Guide

This guide takes you through a basic installation and first-time use of your **VP-436N**.
For more detailed information, see the **VP-436N** user manual. You can download the latest manual at http://www.kramerelectronics.com.

Step 1: Check what's in the box

- The **VP-436N** Presentation Switcher/Scaler
- IR remote control transmitter with batteries
- 1 Power cord
- 1 Set of rack ears
- Null-modem adapter
- 4 Rubber feet
- 1 Quick start guide
- 1 User Manual



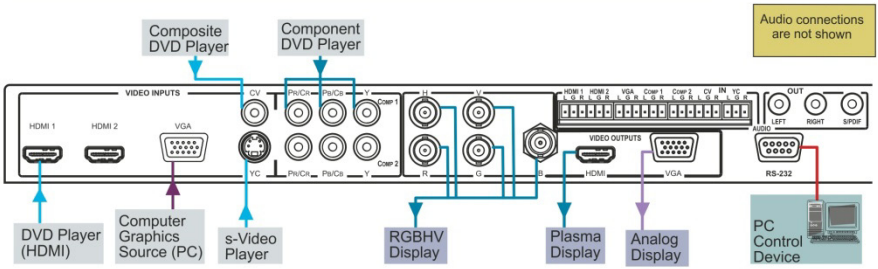
Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

Step 2: Install the VP-436N

Mount the machine in a rack or place on a table.

Step 3: Connect inputs and outputs

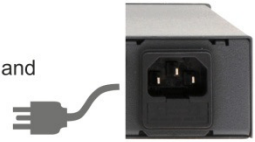
Always switch OFF the power on each device before connecting it to your **VP-436N**.



For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the **VP-436N**.

Step 4: Connect the power

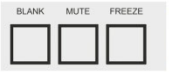
Connect AC power to the rear of the **VP-436N**, switch on its power and then switch on the power on each device.



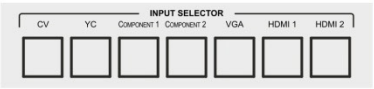
Step 5: Operate via the front panel buttons and the remote control transmitter

Push the MENU button to access the menu and show the main menu on your display.

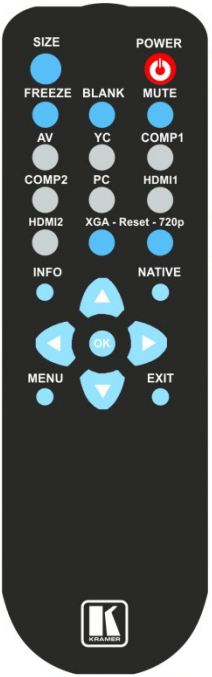
Toggle between blank and display.
Toggle between mute and the audio output.
Freeze/unfreeze the output image.



Select an input



Press the MENU button to access the menu.The arrow buttons and ENTER (OK) button let you navigate within the OSD menu. Press EXIT to exit the menu.



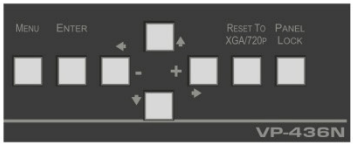
POWER
Cycles power

Reset the output resolution

If you cannot see an image, verify that the output cable to your display, TV, or projector is in good working order and is connected to the **VP-436N** and/or reset the output

Step 6: Configure the VP-436N via the OSD menu

Press the MENU button to open the OSD menu:



CONTRAST
BRIGHTNESS
FINETUNE
COLOR
SIZE
SOURCE
OUTPUT
AUDIO
OSD
FACTORY RESET
INFORMATION
AUTOSYNC
EXIT

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer **VP-436N** Presentation Switcher/Scaler. This product, which incorporates HDMI™ technology, is ideal for:

- Projection systems in conference rooms, boardrooms, hotels and churches
- Home theater up-scaling

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables
- Use only the power cord that is supplied with this machine

Go to http://www.kramerelectronics.com to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **VP-436N** away from moisture, excessive sunlight and dust

3 Overview

The Kramer **VP-436N** is a high quality presentation switcher and scaler. It accepts one of seven inputs: a component video on RCA connectors, computer graphics on a 15-pin HD connector, composite video on an RCA connector, s-Video on a 4-pin connector and two HDMI signals. It scales the video, embeds the audio, and outputs the signal to the HDMI output as well as to a computer graphics output, an RGBHV video output together with a digital audio output and an analog stereo audio output.

Component video is also known as Y, Pb, Pr, or Y, Cb, Cr or YUV; compatible with both SD and HD component

The **VP-436N** is HDTV compatible and the resolution can be up- or down-scaled as follows: Native, VGA, SVGA, XGA, SXGA, UXGA, 480i, 480p, 576i, 576p, 720p (@50 and 60Hz), 1080i (@50 and 60Hz), 1080p (@50 and 60Hz), WXGA, WSXGA, WUXGA, 1280x800, 1440x900, and 1400x1050.

The **VP-436N** Presentation Switcher / Scaler:

- Has an improved HDMI output drive – exceeding 60 feet at 1080p 60Hz
- Has analog audio inputs and digital (S/PDIF) and analog stereo audio outputs
- Automatically detects and selects the audio source for the HDMI input. Default selection is HDMI – if this is not present, then the machine uses the audio from the analog input
- Comes with an On-Screen Display (OSD) for easy setup and adjustment, accessible via the IR remote control and via the front-panel buttons
- Is HDCP Compliant - the HDCP (High Definition Content Protection) license agreement allows copy-protected data on the HDMI input to pass only to the HDMI output
- Has a non-volatile memory that retains the last settings used
- Supports firmware upgrade via RS-232

Control your **VP-436N**:

- Directly, via the front panel push buttons
- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller

- Remotely, from the infrared remote control transmitter

The **VP-436N** is housed in a 19" 1U rack mountable enclosure, with rack "ears" included, and is fed from a 100-240 VAC universal switching power supply.

3.1 About HDMI—General Description

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital audio/video interface, widely supported in the entertainment and home cinema industry. HDMI ensures an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions. It delivers the maximum high-definition image and sound quality in use today. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC.

In particular, HDMI:

- Provides a simple interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy cable

  SIMPLICITY - With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

  LENGTHY CABLE - HDMI technology has been designed to use standard copper cable construction at up to 15m

- Supports standard, enhanced, high-definition video, and multi-channel digital audio on a single cable

  MULTI-CHANNEL DIGITAL AUDIO - HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements

- Benefits consumers by providing superior, uncompressed digital video quality via a single cable, and user-friendly connector

  HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

- Is backward-compatible with DVI (Digital Visual Interface)

- Supports two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play
- Has the capacity to support existing high-definition video formats (720p, 1080i, and 1080p), standard definition formats such as NTSC or PAL, as well as 480p and 576p

3.2 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard, developed by Intel, protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.3 Defining the VP-436N Presentation Switcher/Scaler

This section defines the **VP-436N**.

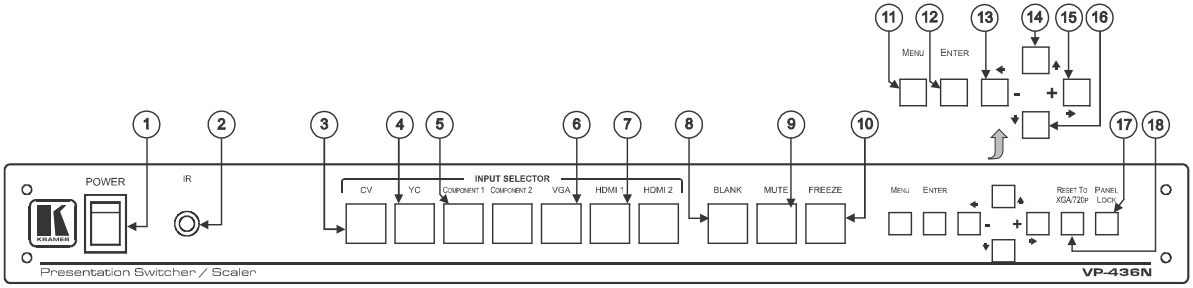


Figure 1: VP-436N Presentation Switcher/Scaler Front Panel

#	Feature		Function
1	POWER Switch		Illuminated switch for turning the unit ON or OFF
2	IR Receiver		Accepts IR remote commands
3	INPUT Selector Buttons	CV	Press to select the composite video input
4		YC	Press to select the s-Video input
5		COMPONENT	Press to select the component video input (from 1 to 2)
6		VGA	Press to select the computer graphics input
7		HDMI	Press to select the HDMI input (from 1 to 2)
8	BLANK Button		Press to toggle between a blank screen (blue or black screen) and the display (can be programmed to follow MUTE)
9	MUTE Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
10	FREEZE Button		Press to freeze/unfreeze the output video image (Can be programmed to follow MUTE)
11	MENU Button		Displays the OSD menu (see Section 6.2)
12	ENTER Button		Press to accept changes, change the SETUP parameters (see Section 6.2) and to auto adjust the image (when not within the OSD menu), see Section 6.1.1
13	- ⬅ Button		Press to decrease numerical values or select from several definitions. For convenience and speed—when not within the OSD menu mode—press to reduce volume
14	⬆ Button		Press to move up the menu list values (see Section 6.2)
15	+ ➡ Button		Press to increase numerical values or select from several definitions. For convenience and speed— when not within the OSD menu mode—press to increase volume
16	⬇ Button		Press to move down the menu list (see Section 6.2)
17	PANEL LOCK Button		Press and hold for about 2 seconds to lock/unlock the front panel buttons
18	RESET TO XGA/720P Button		Press to reset the video resolution to XGA or 720p Press and hold for about 2 seconds to toggle between reset to XGA and reset to 720p

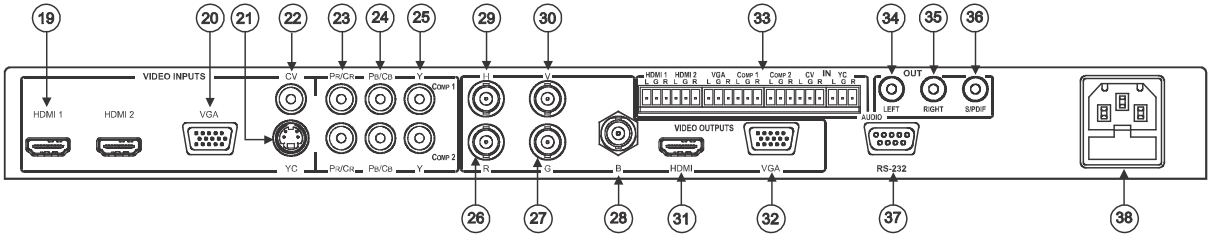


Figure 2: VP-436N Presentation Switcher/Scaler Rear Panel

#	Feature		Function
19	VIDEO INPUTS	*HDMI* Connector	Connect to the HDMI source (from 1 to 2)
20		*VGA* 15-pin HD Connector	Connect to the computer graphics source
21		*YC* 4-pin Connector	Connect to the s-Video source
22		*CV* RCA Connector	Connect to the composite video source
23		*PR/CR* RCA Connector	Connect to the component video source (from 1 to 2) For component video, connect all three connectors: Y, PR/CR, PB/CB (also known as YUV)
24		*PB/CB* RCA Connector	
25		*Y* RCA Connector	
26	VIDEO OUTPUTS	*R* BNC Connector	Connect to the RGBHV video acceptor
27		*G* BNC Connector	
28		*B* BNC Connector	
29		*H* BNC Connector	
30		*V* BNC Connector	
31		*HDMI* Connector	Connect to the HDMI acceptor
32		*VGA* 15-pin HD Connector	Connect to a VGA acceptor
33	*AUDIO IN* Unbalanced Stereo Terminal Block Connectors	HDMI	Connect to the analog audio HDMI source (from 1 to 2)
		VGA	Connect to the analog audio computer graphics source
		COMP	Connect to the analog audio component video source (from 1 to 2)
		CV	Connect to the analog audio composite video source
		YC	Connect to the analog audio s-Video source
34	*OUT* RCA Connectors	LEFT	Connect to the left stereo analog audio acceptor
35		RIGHT	Connect to the right stereo analog audio acceptor
36		S/PDIF	Connect to a digital audio acceptor
37	*RS-232* 9-pin D-sub Port		Connect to the PC or the remote controller
38	Power Connector with Fuse		AC connector, enabling power supply to the unit

4 Installing in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

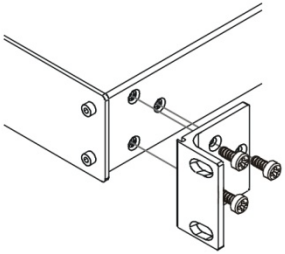
3. The machine is placed straight in the correct horizontal position.

4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

5 Connecting the VP-436N

Always switch off the power to each device before connecting it to your **VP-436N**. After connecting your **VP-436N**, connect its power and then switch on the power to each device.

You do not have to connect all the inputs and outputs, connect only those that are required.

To connect your **VP-436N**, as illustrated in the example in Figure 3, do the following:

1. Connect an HDMI source (for example, a DVD player) to the HDMI 1 VIDEO INPUT connector.
   Alternatively, you can connect the DVI connector on the DVD player to the HDMI connector on the VP-436N via a DVI-HDMI adapter. When using this adapter, you can connect the audio signal via the terminal block connector
2. Connect a computer graphics source to the VGA 15-pin HD VIDEO INPUT connector.
3. Connect a composite video source (for example, a composite video player) to the CV VIDEO INPUT RCA connector.
4. Connect an s-Video source (for example, an s-Video player) to the YC 4-pin VIDEO INPUT connector.
5. Connect a component video source (for example, a component video player) to the COMP 1 P_R, P_B and Y, VIDEO INPUT RCA connectors.
6. Connect the audio input signals to the AUDIO IN terminal block connectors, as required (not shown in Figure 3).
7. Connect the RGBHV VIDEO OUTPUT BNC connectors to an RGBHV acceptor (for example, an RGBHV display).
8. Connect the HDMI VIDEO OUTPUT connector to an HDMI acceptor (for example, a plasma display).

9. Connect the VGA VIDEO OUTPUT 15-pin HD connector to a VGA acceptor (for example, a projector).

10. Connect the audio output signals to the OUT stereo analog audio acceptor and/or the digital audio acceptor, as required (not shown in Figure 3).

11. Connect the power cord (not shown in Figure 3).

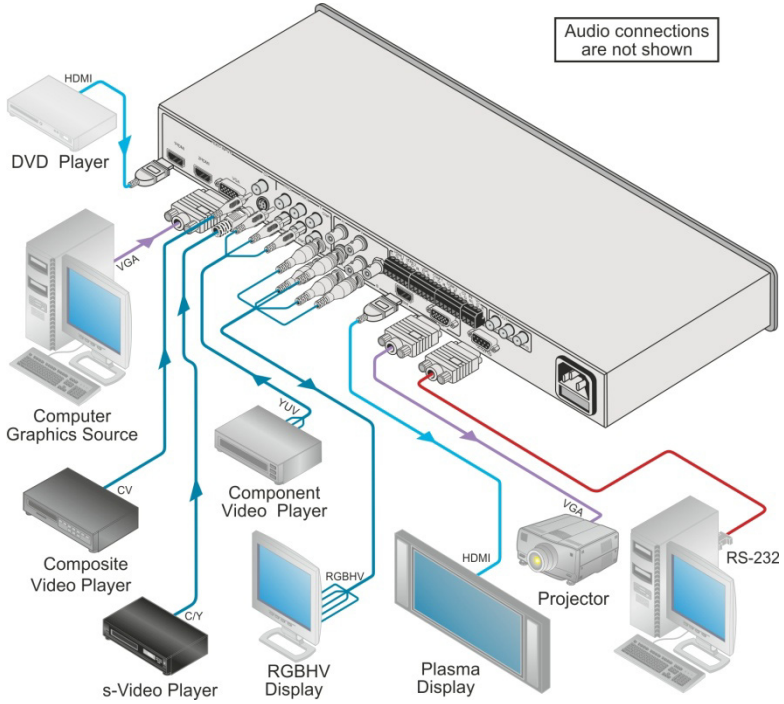


Figure 3: Connecting the VP-436N Presentation Switcher / Scaler

6 Controlling the VP-436N

The **VP-436N** can be controlled via:

- The front panel buttons (see Section 6.1)
- The OSD menu (see Section 6.2)
- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller (see Section 6.3)
- The infrared remote control transmitter (see Section 6.4)

6.1 Controlling via the Front Panel Buttons

The **VP-436N** includes the following front panel buttons:

- Input selector buttons for selecting the required input: CV, YC, COMPONENT (1 and 2), VGA or HDMI (1 and 2)
- BLANK, MUTE and FREEZE buttons
- MENU, ENTER, and up, down, left and right arrow buttons
- RESET TO XGA/720p and PANEL LOCK buttons

6.1.1 The Auto Adjust Feature

The auto adjust feature (which applies only to the VGA input) automatically centers the image on the screen when pressing the ENTER front panel button or the OK button on the remote control transmitter (when not within the OSD menu).

You can also implement this feature every time the input is switched to VGA or when the input resolution changes, via the FINE TUNE menu (see Section 6.2.2).

6.2 Using the OSD Menu

The control buttons let you control the **VP-436N** via the OSD menu.

Press the:

- MENU button to enter the menu (the default timeout is set to 10 seconds)
- ENTER button to accept changes and to change the menu settings

- Arrow buttons to move through the OSD menu, which is displayed on the video output

On the OSD menu, select EXIT to exit the menu.

6.2.1 The MAIN MENU

The range and default values vary according to the input signal.

Mode	Function			
CONTRAST	Set the contrast The range and default values vary according to the input signal			
BRIGHTNESS	Set the brightness The range and default values vary according to the input signal			
FINETUNE	See Section 6.2.2			
COLOR	Set the red, green and blue shades (0 to 100, default 48, 48 and 52 respectively)			
SIZE	Select the size of the display: FULL, OVERSCAN, UNDER1, UNDER2, LETTER BOX and PANSCAN (FULL is the default) **UNDER1** refers to an underscan of 6% **UNDER2** refers to an underscan of 9%			
SOURCE	Select the source: (VGA is the default)			
	Appears as:	Source input	Appears as:	Source input
	CVBS	CV	PC	VGA
	SVIDEO	YC	HDMI1	HDMI 1
	YPBPR1	COMP 1	HDMI2	HDMI 2
	YPBPR2	COMP 2		
	CVBS means Composite Video Baseband Signal			
OUTPUT	Select the output resolution from the menu (NATIVE is the default):			
	Appears as:	Output resolution:	Appears as:	Output resolution:
	1080I60	1080i @60Hz	SXGA+	1400x1050
	1080P60	1080p @60Hz	WXGA	1366x768
	576I	576i	NATIVE	
	576P	576p	VGA	640x480
	720P50	720p @50Hz	SVGA	800x600
	1080I50	1080i @50Hz	XGA	1024x768
	1080P50	1080p @50Hz	SXGA	1280x1024
	1280x800	1280x800	UXGA	1600x1200
	WSXGA	1680x1050	480I	480i
	WUXGA	1920x1200	480P	480p
	WSXGA+	1440x900	720P60	720p @60Hz
	NATIVE - Select NATIVE to select the output resolution from the EDID of the connected HDMI monitor			
AUDIO	See Section 6.2.3			

Mode	Function
OSD	Set the OSD parameters: H POSITION, V POSITION, TIMER, BACKGROUND and DISPLAY (see Section 6.2.4)
HDCP ON INPUT	Select the HDCP option for the HDMI input: either ON (the default) or OFF. Setting HDCP support to enabled (ON) on the HDMI input allows the source to transmit a non-HDCP signal if required (for example, when working with a Mac computer)
HDCP ON OUTPUT	Select FOLLOW INPUT or FOLLOW OUTPUT to define whether the HDCP will follow the input or the output (default FOLLOW OUTPUT). When FOLLOW INPUT is selected, it changes its HDCP output setting (for the HDMI output) according to the HDCP of the input. This option is recommended when the HDMI output is connected to a splitter/switcher (in this mode, switching may not be glitch-free) When FOLLOW OUTPUT is selected, the scaler matches its HDCP output to the HDCP setting of the HDMI acceptor to which it is connected
FACTORY RESET	Resets to the default parameters (resolution is set to XGA or 720p) If you cannot see the display after factory reset, use the front panel Res. button to set the correct resolution: press continuously for 2 seconds to reset to XGA, or continuously for 5 seconds to reset to 720p
INFORMATION	Displays the source, the input resolution, the output resolution and the software version
AUTO SYNC OFF	Turn ON/OFF. When ON, a short period after not detecting a valid video signal on the selected input, the unit will disable the H and V syncs on the analog outputs until a valid input is again detected or any keypad button is pressed
EXIT	Select to exit the menu

6.2.2 The FINETUNE Menu

Input Signal	Parameter	Function
CV, YC, COMPONENT	HUE	Set the hue
	SATURATION	Set the saturation
	SHARPNESS	Set the sharpness
	NOISE REDUCTION	Select the noise reduction: OFF, HI, LOW and MID (middle)
	COLOR FILTER	Set to ON to enable color filtering
VGA	PHASE	Set the phase
	CLOCK	Set the clock frequency
	H-POSITION	Set the horizontal position of the picture
	V-POSITION	Set the vertical position of the picture
	AUTO TUNE	When set to ON, auto adjusts the image (centers it correctly on the screen) every time the input is switched to VGA or when the input resolution changes Alternatively, you can auto adjust the image by pressing the ENTER button when not within the OSD menu
	COLOR FILTER	Set to ON to enable color filtering
HDMI	COLOR FILTER	Set to ON to enable color filtering

The COLOR FILTER feature may improve the output image for certain graphic cards where color fringing is seen.

6.2.3 The AUDIO Menu

Parameter	Function
OUTPUT VOLUME	Set the output volume (from 0 to 100) This feature is disabled when the embedded audio of an HDMI input is selected
INPUT VOLUME	Set the input volume (from 0 to 100) This feature is disabled when the embedded audio of an HDMI input is selected
DELAY	Select the audio delay time: OFF, 40ms, 110ms and 150ms
SOUND	Select the sound options: ON, MUTE
MUTE FOLLOWS	Select the action that will be followed by mute: **INDEPENDENT**: the audio muting is independent of the FREEZE and BLANK functions **FREEZE** **BLANK** **FREEZE/BLANK**: when freezing or blanking the video, the audio will be muted (the MUTE function follows the FREEZE and the BLANK functions)
HDMI AUDIO IN	Select: **AUTOMATIC**: the embedded audio on the HDMI input is selected for an HDMI signal, or the analog audio input is selected if the input is not HDMI (for example, for a DVI input signal) **EMBEDDED**: the embedded audio in the HDMI signal is selected **ANALOG**: the analog audio input is selected HDMI AUDIO IN is enabled only when one of the HDMI inputs is selected

6.2.4 The OSD Menu

Parameter	Function
H POSITION	Set the horizontal position of the OSD (from 0 to 100)
V POSITION	Set the vertical position of the OSD (from 0 to 100)
TIMER	Set the timeout period in seconds (from 5 to 100)
BACKGROUND	Set the OSD background between 0 (solid black) and 8 (transparent)
DISPLAY	Select the information shown on the screen during operation: **ON** - the information is shown permanently **OFF** - the information is not shown **INFO** - the information is shown for a few seconds

6.3 Connecting to the VP-436N via RS-232

You can connect to the unit via a crossed RS-232 connection, using for example, a PC. A crossed cable or null-modem is required as shown in method A and B respectively. If a shielded cable is used, connect the shield to pin 5.

Method A (Figure 4)—Connect the RS-232 9-pin D-sub port on the unit via a crossed cable (only pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5 need be connected) to the RS-232 9-pin D-sub port on the PC.
Note: There is no need to connect any other pins.

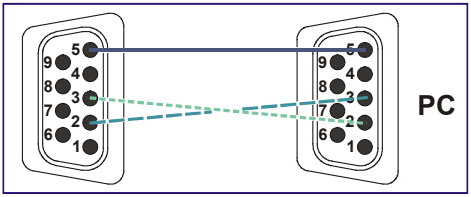


Figure 4: Crossed Cable RS-232 Connection

Hardware flow control is not required for this unit. In the rare case where a controller requires hardware flow control, short pin 1 to 7 and 8, and pin 4 to 6 on the controller side.

Method B (Figure 5)—Connect the RS-232 9-pin D-sub port on the unit via a straight (flat) cable to the null-modem adapter, and connect the null-modem adapter to the RS-232 9-pin D-sub port on the PC. The straight cable usually contains all nine wires for a full connection of the D-sub connector. Because the null-modem adapter (which already includes the flow control jumpering described in Method A above) only requires pins 2, 3 and 5 to be connected, you are free to decide whether to connect only these 3 pins or all 9 pins.

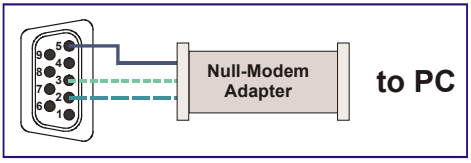


Figure 5: Straight Cable RS-232 Connection with a Null Modem Adapter

6.4 Controlling via the Infrared Remote Control Transmitter

You can control the **VP-436N** from the infrared remote control transmitter:

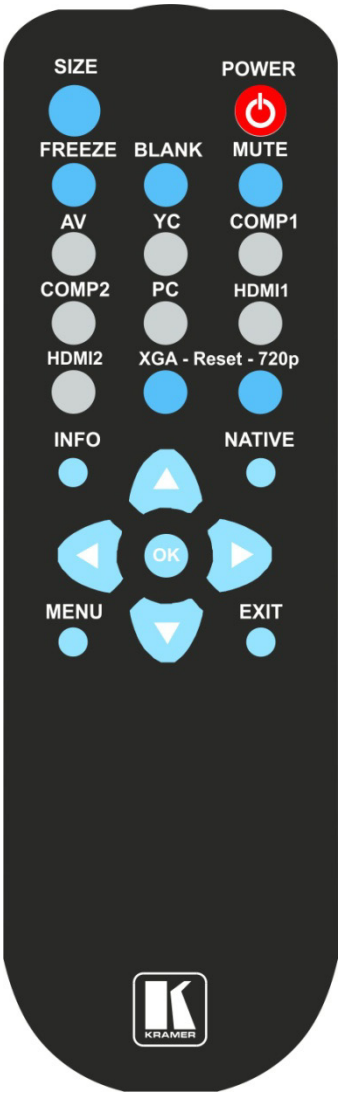
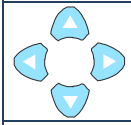


Figure 6: Infrared Remote Control Transmitter

Keys	Function
SIZE	Set the size of the image displayed
POWER	Turn the **VP-436N** ON or OFF (the outputs and the front-panel are disabled)
FREEZE	Freeze/unfreeze the output video image
BLANK	Toggle between a blank screen (blue or black screen) and the display
MUTE	Toggle between muting (blocking out the sound) and enabling the audio output
AV	Select the composite video input
YC	Select the s-Video input
COMP1	Select the component video 1 input
COMP2	Select the component video 2 input
PC	Select the UXGA input
HDMI1	Select the HDMI1 input
HDMI2	Select the HDMI2 input
XGA Reset	Reset the resolution to XGA
720p Reset	Reset the resolution to 720p
INFO	Displays the selected input, the input and output resolutions and the firmware versions on the OSD
NATIVE	Select the output resolution via the EDID of the connected HDMI monitor
	Four navigation keys
OK	Press to accept changes Press also to auto adjust the picture (see Section 6.1.1)
MENU	Enter the OSD menu
EXIT	EXIT the menu

7 Technical Specifications

INPUTS:	2 HDMI connectors 1 VGA on a 15-pin HD connector 1 composite video on an RCA connector 1 Y/C on a 4-pin connector 2 component video each on 3 RCA connectors 2 HDMI, 1 VGA, 2 COMP, 1 CV, 1 Y/C unbalanced stereo audio on 7 3-pin terminal block connectors
OUTPUT:	1 RGBHV on 5 BNC connectors 1 HDMI connector 1 VGA on a 15-pin HD connector 1 S/PDIF on an RCA connector 1 unbalanced stereo audio on RCA connectors
H FREQUENCY:	15.63-90kHz
V FREQUENCY:	23-90Hz
RGB SYNCS:	H and V TTL separated syncs
RGB LEVEL:	1.2Vpp max, 75Ω load
XGA OUT LEVEL:	1.2Vpp max, 75Ω load
S/PDIF OUT LEVEL:	0.55Vpp constant
POWER SOURCE:	100−240V AC, 33VA max.
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
OUTPUT RESOLUTIONS:	Native, VGA, SVGA, XGA, SXGA, UXGA, 480i, 480p, 576i, 576p, 720p, 1080i, 1080p, WXGA, WSXGA, WUXGA, 1280x800, 1440x900, 1400x1050
OUTPUT REFRESH RATE:	60Hz for computer graphics resolutions, 50/60Hz for HDTV resolutions
CONTROLS:	CV, YC, component 1, component 2, VGA, HDMI 1, HDMI 2, input selector buttons; blank, mute, freeze buttons; menu, enter, menu arrows, reset to XGA/720p, lock buttons, RS-232, IR
POWER SOURCE:	100-240V AC, 33VA max.
DIMENSIONS:	19" x 7" x 1U (W, D, H) rack mountable
WEIGHT:	2.7kg (6lbs) approx.
ACCESSORIES:	Power cord, null-modem adapter, rack ears, IR remote control
Specifications are subject to change without notice at http://www.kramerelectronics.com	

7.1 Input Resolutions

Resolution/Refresh Rate	CV/s-Video	Component	VGA	HDMI
480I/576I (NTSC/PAL)	Yes (480i30x2 / 576i25x2)	Yes	No	No
480P/576P	No	Yes	Yes	Yes
720P @(60/50)	No	Yes	Yes	Yes
1080I @(60/50)	No	Yes	No	Yes
1080P @(60/50)	No	Yes	Yes	Yes
1080P @(24/30)	No	Yes	No	Yes
VGA @(60/72/75/85)	No	No	Yes	Yes
SVGA @(56/60/72/75/85)	No	No	Yes	Yes
XGA @(60/70/75/85)	No	No	Yes	Yes
SXGA @(60/75/85)	No	No	Yes	Yes
UXGA @60	No	No	Yes	Yes
WXGA@60 (1366x768)	No	No	Yes	Yes
WSXGA@60 1680x1050)	No	No	Yes	Yes
WUXGA@60(1920x1200)	No	No	Yes	Yes

7.2 Default Communication Parameters

RS-232	
Protocol 2000	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	HEX
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81

8 RS-232 Communication Protocol

The following is the COM port setting:

Baud Rate: 9600bps

Parity: None

Data Bits: 8bits

Stop Bits: 1bit

Set CTS Mode: Off

Set XON/XOFF: Off

Character Symbols Definitions	
Symbol	**Meaning**
☐	Space
[CR]	Carriage Return, ASCII code 0x0D
[LF] or >	Line Feed, ASCII code 0x0A

Set and Get Command

Set Command:

Type in: Y■Control_Type■Function■Param[CR]

Reply: Z■Control_Type■Function■Param[CR][LF]

Get Command:

Type in: Y■Control_Type■Function[CR]

Reply: Z■Control_Type■Function■Param[CR][LF]

When sending a command, a blank character may precede [CR] if desired

Example:

Example 1: set brightness value as 32

Send: Y■1■16■32[CR]

Reply: Z■1■16■32[CR][LF]

Example 2: get current output resolution. (2 = SVGA)

Send: Y■4■21[CR]

Reply: Z■4■21■2[CR][LF]

8.1 RS-232 Protocol Table

Control Type	Function	Param (for Set)	Function Description	Comment
0	0	N/A	SIZE button on remote control	
0	1	N/A	POWER button on remote control	
0	2	N/A	FREEZE button on remote control	
0	3	N/A	480p button on remote control	
0	4	N/A	576p button on remote control	
0	5	N/A	720p button on remote control	
0	6	N/A	1080i button on remote control	
0	7	N/A	1080p button on remote control	
0	8	N/A	VGA button on remote control	
0	9	N/A	SVGA button on remote control	
0	10	N/A	XGA button on remote control	
0	11	N/A	SXGA button on remote control	
0	12	N/A	WXGA button on remote control	
0	13	N/A	UXGA button on remote control	
0	14	N/A	INFO button on remote control	
0	15	N/A	UP button on remote control	
0	16	N/A	NATIVE button on remote control	
0	17	N/A	LEFT button on remote control	
0	18	N/A	OK button on remote control	
0	19	N/A	RIGHT button on remote control	
0	20	N/A	MENU button on remote control	
0	21	N/A	DOWN button on remote control	
0	22	N/A	EXIT button on remote control	
0	23	N/A	AV button on remote control	
0	24	N/A	YC button on remote control	
0	25	N/A	COMP1 button on remote control	
0	26	N/A	HDMI1 button on remote control	
0	27	N/A	HDMI2 button on remote control	
0	28	N/A	COMP2 button on remote control	
0	29	N/A	VGA button on remote control	
0	30	N/A	BLANK button on remote control	
0	31	N/A	MUTE button on remote control	
0	33	N/A	Auto adjust	FW V6.12
1: Set 2: Get	4	0~100	Color: Red	
1: Set 2: Get	5	0~100	Color: Green	
1: Set 2: Get	6	0~100	Color: Blue	
1: Set 2: Get	16	0~100	Brightness	

Control Type	Function	Param (for Set)	Function Description	Comment
1: Set 2: Get	17	0~100	Contrast	
1: Set 2: Get	25	0~100	Hue	
1: Set 2: Get	26	0~100	Sharpness	
1: Set 2: Get	29	0~100	Saturation	
1: Set 2: Get	33	0~100	Output volume setting	
1: Set 2: Get	34	0~100	Input volume setting	
0: Set	35	N/A	Volume down	
0: Set	37	N/A	Volume up	
1: Set 2: Get	41	0~100	OSD Setting :H-Position	
1: Set 2: Get	42	0~100	OSD Setting: V-Position	
1: Set 2: Get	43	0~100	OSD Timeout	
1: Set 2: Get	44	0~8	OSD Background	
1: Set 2: Get	50	0~3	NR (Noise Reduction)	0: Off 1: Low 2: Mid 3: High
1: Set 2: Get	51	0~3	Audio delay	0: Off 1: 40ms 2: 110ms 3: 150ms
1: Set 2: Get	52	0~2	HDMI AUDIO IN	0 : AUTOMATIC 1 : EMBEDDED 2 : ANALOG
1: Set 2: Get	84	0~1	Auto Sync Off	0 : OFF 1 : ON
1: Set 2: Get	160	0~1	INPUT HDCP Option	0: OFF 1: ON (FW: 6.27)
1: Set 2: Get	161	0~1	OUTPUT HDCP Option	0 : Follow input (FW 6.29) 1 : Follow output
3: Set 4: Get	0	1~7	Select Input Source	1: AV 2: YC 3: COMP1 4: COMP2 5: VGA 6: HDMI1 7: HDMI2

Control Type	Function	Param (for Set)	Function Description	Comment
3: Set 4: Get	1	0~5	Size	0: Full 1: Panscan 2: Overscan 3: Underscan 4: Letterbox 5: Underscan2
3: Set 4: Get	21	0~21	Output Resolution	0: Native 1: VGA 2: SVGA 3: XGA 4: SXGA 5: UXGA 6: 480i 7: 480p 8: 720p60 9: 1080i60 10: 1080p60 11: 576i 12: 576p 13: 720p50 14: 1080i50 15: 1080p50 16: WXGA 17: WSXGA 18: WUXGA 19: 1280x800, 20: WXGA+ (1440X900) 21: SXGA+ (1400X1050)
3: Set	23	1	Factory Reset	
6: Set 7: Get	0	0~2	Power	0: Power Down 1: Power On 2: Reboot (FW V6.22)
6: Set 7: Get	1	0~1	Freeze	0: Off 1: On
6: Set 7: Get	2	0~1	Blank	0: Off 1: On
6: Set 7: Get	3	0~1	Mute	0: Off 1: On
6: Set 7: Get	4	0~1	Key lock	0: Off 1: On

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing